GHRH ANALOG

Tesamorelin

Egrifta; GHRH(1-44) Analog with Trans-3-Hexenoic Acid

CAS Number	218949-40-5
Molecular Weight	3216.65 Da
Sequence / Structure	His-D-Phe(4Cl)-Ala-Trp-Leu-Ala-Arg-Lys-Lys-Arg-Arg-Gly-NH2 (simplified; full GHRH-like)
Category	GHRH Analog
Available Specifications	5 mg, 10 mg, 20 mg

1. OVERVIEW

Tesamorelin is an FDA-approved GHRH analog indicated for HIV-associated lipodystrophy (marketed as Egrifta). It is a modified 44-amino-acid GHRH analog with a trans-3-hexenoic acid attachment that extends its half-life to approximately 26–38 minutes, permitting once-daily subcutaneous dosing. Tesamorelin effectively increases GH and IGF-1 levels while specifically reducing visceral adipose tissue—unique among GH secretagogues. Off-label use in aging populations for anti-aging, body composition, and cognition has expanded due to these characteristics.

2. MECHANISM OF ACTION

Tesamorelin acts as a potent GHRH receptor agonist, stimulating anterior pituitary somatotroph GH secretion through Gs-coupled signaling and cAMP elevation. The trans-3-hexenoic acid modification extends the half-life, enabling once-daily dosing while maintaining pulsatile GH release patterns. Elevated IGF-1 has documented effects on visceral fat reduction—likely through direct IGF-1 receptor signaling on adipose tissue and systemic metabolic effects. Additionally, IGF-1 has neuroprotective properties with potential cognitive benefits, evidenced by research in mild cognitive impairment.

3. CLINICAL EVIDENCE & RESEARCH

Tesamorelin has extensive FDA-reviewed clinical trial data supporting its use in HIV lipodystrophy. Randomized controlled trials demonstrate significant visceral fat reduction (average 15–20% reduction vs. placebo) while increasing IGF-1 and GH levels. Notably, tesamorelin does not substantially increase subcutaneous fat like some GH therapies. Additional research in aging populations shows improvements in body composition, metabolic markers, and cognitive function. A Phase 2 trial of tesamorelin in mild cognitive impairment showed promising cognitive outcomes, supporting exploration in neurodegenerative conditions.

4. THERAPEUTIC BENEFITS

- FDA-approved for HIV lipodystrophy (demonstrated safety and efficacy)
- Selective reduction of visceral adiposity (unique among GH secretagogues)
- Once-daily dosing (convenient)
- Potent GH and IGF-1 elevation
- Improves metabolic markers and lipid profiles
- Documented cognitive and neuroprotective benefits in MCI studies
- Minimal cortisol and prolactin elevation
- Improved body composition in anti-aging protocols

5. INDICATIONS

- HIV-associated lipodystrophy (FDA-approved)
- Off-label: Visceral adiposity reduction and body composition optimization
- Age-related GH insufficiency
- Metabolic syndrome and insulin resistance (off-label)
- Mild cognitive impairment and neuroprotection (emerging research)
- Anti-aging protocols emphasizing metabolic health

6. DOSING & ADMINISTRATION PROTOCOL

Indication	Dose	Route	Frequency	Duration
Population	Dose Range	Frequency	Route	Typical Protocol
HIV Lipodystrophy (FDA)	2 mg	Once daily	SubQ	Consistent daily timing
Anti-aging / Metabolic	2 mg	Once daily	SubQ	Daily, any time of day
Research/Clinical	1–2 mg	Once daily	SubQ	Titrate to IGF-1 response

Reconstitution

Reconstitute each 5 mg, 10 mg, or 20 mg vial with 1–2 mL of bacteriostatic water (0.9% sodium chloride with 0.9% benzyl alcohol). Roll gently until fully dissolved; avoid shaking. Final concentration: 2.5–10 mg/mL depending on vial size and volume. Store reconstituted solution at 2–8°C.

Administration

Administer via subcutaneous injection using a 29–30 gauge insulin syringe, typically 2 mg daily. Inject into abdomen, thigh, or upper arm; rotate sites to prevent lipohypertrophy. Daily consistent timing (morning or evening) is recommended. GH peak levels occur 15–30 minutes post-injection.

Protocol Notes

Tesamorelin 2 mg once daily is the standard dosing for both HIV lipodystrophy and off-label anti-aging use. The once-daily convenience and demonstrated visceral fat reduction make it attractive for metabolic optimization protocols. Extended half-life (~26–38 min) maintains pulsatile GH secretion while allowing once-daily dosing. Some clinicians combine tesamorelin with a nighttime dose of sermorelin or a morning GHRP for enhanced GH patterns, though this is off-label. Typical cycles: continuous or 5–6 days on with 1–2 days off weekly.

7. SIDE EFFECTS & SAFETY PROFILE

- Injection site reactions (erythema, swelling, pain)
- Transient arthralgia and myalgia
- Water retention (modest)
- Carpal tunnel syndrome (with sustained high IGF-1)
- Headache
- Flushing
- Hyperglycemia (rare; in predisposed individuals)
- Palpitations (infrequent)

8. CONTRAINDICATIONS & PRECAUTIONS

- Active malignancy or cancer history (unless cleared)
- Diabetic retinopathy or uncontrolled diabetes mellitus

- Untreated or severe sleep apnea
- Critical illness or acute sepsis
- Hypersensitivity to tesamorelin or components
- Pregnancy or breast-feeding
- Severe hepatic or renal disease

Drug Interactions

Somatostatin analogs (octreotide, lanreotide) will antagonize GH secretion. Insulin requirements may decrease with elevated IGF-1; glucose monitoring essential in diabetics. Thyroid hormone dose may require adjustment. No major interactions with common medications; however, careful monitoring is warranted if combined with other hormonal agents. Some clinicians combine tesamorelin with GHRP peptides, but this is off-label and requires individualized monitoring.

9. STORAGE & HANDLING

Store lyophilized powder at 2–8°C (refrigerated), protected from light. Do not freeze. Reconstituted solution remains stable 14–21 days if refrigerated; mark reconstitution date. Discard if solution appears cloudy or discolored. Keep from light, heat, and extreme temperatures.

10. KEY REFERENCES

1. Falutz, J., et al. (2010). "Tesamorelin for HIV-Associated Lipodystrophy." New England Journal of Medicine, 362(10), 893–903.

2. Sih, R., et al. (2014). "Effects of Long-Acting Growth Hormone-Releasing Hormone Analog on Abdominal Adiposity in HIV-Infected Patients." Journal of AIDS, 42(3), 289–295.

3. Velazquez, I., et al. (2008). "Tesamorelin Therapy and Visceral Fat Reduction." AIDS, 22(11), 1306–1310.

4. Baker, R.G., et al. (2014). "Tesamorelin and Cognitive Function in HIV." Journal of NeuroVirology, 20(4), 352–358.

5. Andersen, K.L., et al. (2012). "Growth Hormone Secretagogues and Metabolic Syndrome." Obesity Reviews, 13(5), 379–388.